Column for California Classroom Science, CSTA Paper, September 1995 issue

Space Window

by

Fred Shair, Manager of Educational Affairs, NASA's Jet Propulsion Laboratory and
James Wilson, Public information Specialist

California Classroom Science has invited us to provide this window for teachers on NASA's varied and exciting scientific activities. We are eager to support California's science teachers ever more strongly, with new communications techniques as well as new scientific knowledge.

The National Aeronautics and Space Administration has three field centers in California: the Ames Research Center in Mountain View, the Dryden Flight Research Center at Edwards in the Mojave Desert, and the Jet Propulsion laboratory. Ames specializes in aeronautics research and information technology, with activities in astrobiology and space science. Dryden conducts aircraft flight operations of all kinds and is the backup Space Shuttle landing site. JPL specializes in planetary exploration and planetary science, developed and manages NASA's Deep Space Network, and does a variety of related research and development.

Our planet has sent out four interstellar travelers: Pioneer 10 and 11, managed by NASA Ames, and Voyager 1 and 2, managed by JPL. After planetary missions to Jupiter and other outer planets, they are headed in four directions for the heliopause, the Solar System's frontier with interstellar space, with hopes of reaching it next century and sending us scientific data on this farthest frontier. For an excellent discussion of the "Quest for the Limits of the Heliosphere," see Jokipii and McDonald's article in the April 1995 issue of *Scientific American.*

Another Jupiter spacecraft mission, Galileo, will reach the giant planet on December 7, 1995. Galileo's probe will enter the atmosphere for a 75-minute parachute descent, radioing its data to the Galileo orbiter far above. Soon after, the orbiter will maneuver into the first of more than ten observing orbits around Jupiter, with close passes over all the large Galilean satellites and a comprehensive study of the entire Jovian system. Galileo has already made the first close observations of two asteroids, finding a tiny moon orbiting one of them, and observed the 1994 comet impacts on Jupiter. JPL manages this project for NASA; Ames is responsible for the probe.

NASA is partnered with the European Space Agency in the Ulysses mission, whose European-built spacecraft spent this summer high above the north polar region of the Sun; last summer it was over the southern region. JPL provides mission operations and communications

via the Deep Space Network, and the scientific activities are shared. TOPEX/Poseidon is an oceanographic satellite operated in collaboration between NASA-J]'], and the French Space Agency.

Future spacecraft missions to Saturn (Cassini orbiter and probe) and to Mars (Global Surveyor orbiter and Pathfinder lander and rover) are in active development at JPL, which is also planning "pre-project" missions such as small orbiting observatories and a flight to Pluto. JPL has developed and is developing a variety of Earth-observing instruments to fly on the Space Shuttle and other orbiting spacecraft, as well as the Wide Field and Planetary Camera on the Space Telescope. Future articles will describe current projects in more detail and how these projects might help you embed ongoing elements of discovery within your curricula.

All three NASA Centers maintain Teacher Resource Centers. The Ames TRC is at Mail Stop 204-12, NASA/ARC, Moffett Field, CA 94035. At Dryden, contact the Public Affairs Office, NASA Dryden FRC, Edwards AFB, CA 93523. At JPL, the TRC is at Mail Code CS-530, NASA/JPL, 4800 Oak Grove Drive, Pasadena, CA 91109. in addition, the NASA San Joaquin Valley Regional TRC is located at California State University, Fresno, at 5005 N. Maple Ave, Fresno, CA 93740-0001. NASA centers may also be accessed on internet via the World Wide Web; J]'] .'s home page is at http: www.jpl.nasa.gov/, providing links to JPL projects and educational outreach and to the NASA home page system covering al 1 NASA activities.